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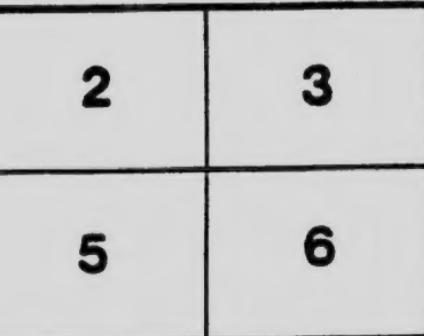
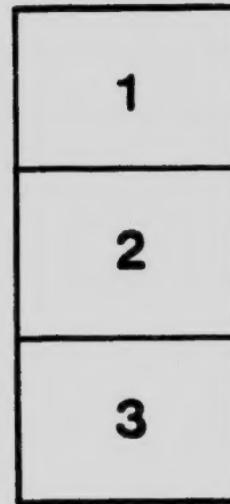
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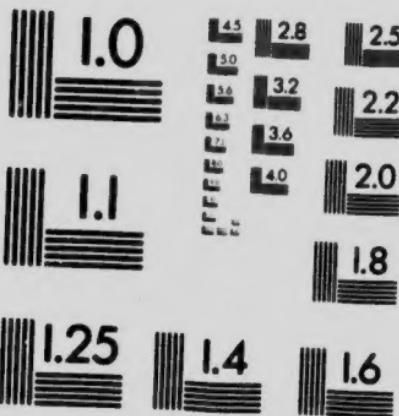
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DEPARTMENT OF THE INTERIOR, CANADA

Hon. FRANK OLIVER, Minister; W. W. COX, Deputy Minister

FORESTRY BRANCH—BULLETIN No. 27.

R. H. CAMPBELL, Director of Forestry.

FOREST PRODUCTS OF CANADA

1910

TIGHT AND SLACK COOPERAGE

COMPILED BY

H. R. MACMILLAN, B.S.A., M.F.

Assisted by BRUCE ROBERTSON and GUY BOYCE

11106—1

OTTAWA
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LETTER OF TRANSMITTAL.

FORESTRY BRANCH,

DEPARTMENT OF THE INTERIOR,

OTTAWA, October 4, 1911.

Sir,—

I beg to transmit herewith a report on the 'Wood used for Cooperage' throughout the Dominion for the calendar year 1910, and to recommend its publication as Bulletin No. 27 of this Branch.

The report contains a general summary of the quantity and value of the wood used for both slack and tight cooperage during the year and the quantity used for each of the two kinds of cooperage according to species.

I have the honour to be, Sir,

Your obedient servant,

R. H. CAMPBELL,
Director of Forestry.

W. W. CORY, C.M.G.,
Deputy Minister of the Interior,
Ottawa.

01 - 856



TIGHT AND SLACK COOPERAGE, 1910.

The information upon which the following statistics as to the cooperage production in Canada in 1910 are based was received from 133 firms. The mills are distributed through the various provinces as follows:—Ontario, 94; Nova Scotia, 16; Quebec, 14; New Brunswick, 5; British Columbia, 3, and Manitoba, 1. Seven of these were not operating, making the number of active firms throughout Canada 126.

The manufacturing of cooperage stock has always been one of the leading minor wood-industries in Canada. The industry flourished in Canada before the United States developed it, for Canada originally had a great amount of oak and other timber for cooperage between the St. Lawrence valley and Lake Huron to meet the requirements of such an industry. A great part of the timber was hewn into staves, heading and stave bolts, and shipped out to other countries. Staves for wine casks went to France and Spain. England used many for whisky casks and at the time the West Indies had its great trade in sugar with England, Canadian staves were shipped to England, made into barrels, sent over to the West Indies to be filled with sugar and molasses, and returned again to England.

This large export trade has fallen off greatly, owing to the shortage of suitable straight timber of first quality, and shows a steady decline from 1896, when the maximum was shipped, down to the present. In the middle of the last decade exports of staves, heading and stavebolts amounted to \$736,000, while in 1910 exports of staves, heading and barrels were \$115,000.¹

The cooperage stock industry as a whole has decreased \$100,000 during 1910, owing to a great falling off in the production of slack cooperage. In table 1 is given a summary of the cooperage industry, slack and tight, in Canada in 1910, showing the per cent each forms of the total.

¹ The annual amount exported varies considerably and varies with the amount of cooperage left on the manufacturer's hands after the season's production has been shipped.

TABLE 1.

COOPERAGE STOCK, 1910, BY CLASSES: Total Quantity, Total Value and Per Cent Distribution.

| Class. | Quantity. | Value. | Per Cent Distribution by Quantity. |
|------------------|-----------|-------------|------------------------------------|
| | M pieces. | \$ | |
| Total | 161,641 | \$1,740,709 | 100 |
| Slack Cooperage | 152,925 | 1,395,545 | 94.6 |
| Staves | 104,821 | 736,960 | 69 |
| Heading (sets) | 9,860 | 330,480 | 6 |
| Hoops | 38,244 | 328,105 | 25 |
| Tight Cooperage | 8,716 | 345,164 | 5.4 |
| Staves | 8,379 | 272,924 | 96.2 |
| Sawed | 7,137 | 195,788 | 85.1 |
| Ale and beer | 923 | 44,814 | 11.6 |
| Bucked and split | 319 | 32,322 | 3.6 |
| Heading (sets) | 337 | 72,240 | 3.8 |
| Sawed | 290 | 60,084 | 86 |
| Ale and Beer | 47 | 12,156 | 14 |

The value of the cooperage industry in Canada in 1910 was \$1,740,709. Slack cooperage made up \$1,395,545 of this, or \$200,000 less than in 1909. Tight cooperage amounted to \$345,164, which is \$100,000 more than in 1909. Notwithstanding the decrease in value of slack cooperage for 1910, the number of pieces produced was 500,000 more than in 1909. By quantity, slack cooperage forms 94.6 per cent of the total. By value it constitutes four fifths, or 80.7 per cent. 780,000 pieces less tight cooperage were turned out in 1910 than during the previous year, and the total of 8,716,000 pieces forms one twentieth of the cooperage industry. Considering the value of tight cooperage it represents one fifth of the cooperage stock industry.²

Slack Cooperage.

The production of slack cooperage stock is a much greater industry in Canada than tight cooperage, because the products to be shipped in Canada are to a great extent dry. Moreover, the species of wood now found in Canada are not suitable for tight cooperage in any quantity, and slack cooperage may be produced in conjunction with sawmill plants. A great number of species are used in common by these two industries, so that small trees, short lengths,

² Returns received from the Department of Trade and Commerce give the imports of cooperage stock for 1910 as follows: 7,220,000 listed or jointed oak staves at \$200,672, stave bolts not otherwise specified to the value of \$81,888 and 93,811 empty barrels worth \$112,126. Practically all these importations come from the United States.

defective logs and cuttings useless to the sawmill may be conserved and used for slack cooperage. Slabs are used to a considerable extent in the United States, particularly for heading, although such economy has not yet been reported in Canada.

Table 2 gives in detail the quantity and value of the different species of wood used in slack cooperage for staves, heading and hoops.

TABLE 2.

SLACK COOPERAGE STOCK, 1910, BY SPECIES: Total Quantity, Total Value and Average Value of the Staves, Heading and Hoops manufactured in Canada.

| Kind of Wood. | STAVES. | | | HEADING. | | | HOOPS. | | |
|-----------------|-----------|---------|----------------|-----------|---------|----------------------|-----------|---------|----------------|
| | Quantity. | Value. | | Quantity. | Value. | | Quantity. | Value. | |
| | | Total. | Average per M. | | Total. | Average per M. sets. | | Total. | Average per M. |
| | Thousand | \$ | \$ c. | Thousand | \$ | \$ c. | Thousand | \$ | \$ c. |
| Total..... | 104,821 | 736,960 | 7.03 | 9,860 | 330,480 | 33.52 | 38,244 | 328,105 | 8.58 |
| Elm..... | 61,308 | 477,034 | 7.78 | 1,057 | 54,567 | 51.62 | 32,002 | 281,719 | 8.78 |
| Spruce..... | 19,429 | 109,592 | 5.64 | 1,452 | 45,974 | 31.66 | 1,433 | 7,718 | 5.38 |
| Poplar..... | 9,160 | 58,603 | 5.40 | 1,901 | 30,590 | 16.08 | 1,088 | 7,272 | 6.69 |
| Balsam Fir..... | 3,363 | 14,337 | 4.26 | 268 | 8,726 | 32.58 | 653 | 3,695 | 5.66 |
| Ash..... | 3,016 | 18,271 | 6.05 | 161 | 5,359 | 33.30 | 570 | 5,205 | 9.13 |
| Birch..... | 2,705 | 17,263 | 6.38 | 486 | 23,659 | 48.68 | 986 | 8,922 | 9.05 |
| Maple..... | 2,364 | 15,316 | 6.48 | 740 | 28,726 | 38.82 | 437 | 3,974 | 9.07 |
| Basswood..... | 1,854 | 13,665 | 7.37 | 3,724 | 129,791 | 34.85 | 960 | 9,450 | 9.86 |
| Beech..... | 700 | 3,953 | 5.65 | 12 | 480 | 40.00 | | | |
| Cottonwood..... | 600 | 6,000 | 10.00 | | | | 25 | 150 | 6.00 |
| Hemlock..... | 248 | 2,237 | 9.02 | 4 | 200 | 50.00 | | | |
| Pine..... | 50 | 225 | 4.50 | 37 | 1,193 | 32.24 | | | |
| Oak..... | 16 | 144 | 9.00 | 18 | 1,098 | 61.00 | | | |
| Cedar..... | 8 | 320 | 40.00 | | 120 | | | | |

There were manufactured in Canada, during 1910, 104,821,000 slack staves, valued at \$736,960; 9,860,000 sets of slack heading, valued at \$330,480 and 38,244,000 hoops, valued at \$328,105.

In the manufacture of slack staves in 1910, fourteen kinds of wood were used, from one of which (elm) a production of over 60,000,000 staves was reported and from six of which (beech, cottonwood, hemlock, pine, oak and cedar) a total of less than 2,000,000 was reported. Although the proportion of the total formed by elm and spruce, namely, four fifths, is the same as is 1909, spruce is slowly becoming more important as a stave wood, over 200,000 pieces more of it being used during 1910 and 5,000,000 pieces less of elm. The shortage of elm will soon cause it to be used chiefly for hoops. Poplar furnished nine per cent of the staves manufactured, and along with balsam fir and ash was used to a much greater extent than in 1909. Balsam fir, in particular, is coming into favor, 200,000 staves of this wood being used in 1909, according to the reports, and 3,363,000 pieces in 1910. The consumption of birch and maple for slack staves is becoming less, although still forming together one twentieth of the total. Hemlock, pine, oak and cedar are species not previously reported as slack cooperage stock.

In average value per unit each class of slack cooperage shows a decrease in 1910. The average price of slack staves fell off 75 cents per thousand pieces, and this decrease is seen in each of the species except birch and maple, the use of which is decreasing.

Elm, at \$7.78 per thousand, is the most expensive wood used in large quantity. Basswood comes next, at \$7.37, with spruce and balsam fir staves cheapest, at \$5.64 and \$4.26 respectively. Of the species used in small quantities, cedar was highest in price at \$40.00 and pine staves cheapest at \$4.50. The high price of elm, poplar and basswood is due to the superior quality of cooperage, such as flour, sugar and apple barrels, made from these species. Balsam fir and spruce are used to a great extent for nail kegs, some particularly cheap spruce staves being produced for this purpose in New Brunswick. Cottonwood, as last year, was used for sugar barrels in British Columbia at \$10.00 per thousand staves. Most of the hemlock cut found its way into lime barrels in Quebec at the same price, \$9.00, as the oak, which was used in the same province. The cedar at \$40.00, the most expensive stave wood, was made up into tub staves.

Every species of wood used in stave manufacture except cottonwood and cedar was used in the production of heading, as short lengths and other pieces not suitable for staves can be readily used for this purpose. When the manufacturer is free to choose his wood, basswood is used, and its suitability is shown by the fact that nearly one half of the heading manufactured in 1910 was of this species. Poplar is used mostly in flour barrels and on account of its wide and abundant distribution is easily obtained. Spruce and elm, the two important stave woods, have considerable waste which is utilized in the manufacture of heading. Over 1,000,000 sets each of the above four species (basswood, poplar, spruce and elm) were produced in 1910 and these species together formed over four fifths of the total. The percentage manufactured of each of the leading species was : basswood, 37.7 per cent; poplar, 19.3 per cent; spruce, 14.7 per cent; elm, 10.7 per cent.

Owing to the more detailed reports of 1910 average prices are much more accurate than in 1909. Heading in 1910 had an average value of \$33.53, or \$18.50 less than the year previous. This decrease is due mainly to the cheapness of spruce and poplar heading. Of the important species elm was the most expensive at \$51.63 per thousand sets; basswood, ash, balsam fir and spruce ranged between \$35.00 and \$30.00; poplar was the cheapest heading in 1910, at \$16.08 per thousand sets, which partly accounts for its wide use.

Hoops were reported as being made from nine species of wood in 1910; in 1909 only five were reported. Poplar, balsam fir, ash and hemlock are the newly reported species. Elm has been for many years the principal hoop wood, contributing in 1910 84 per cent of the total. Over a million hoops each of spruce and poplar were used; these, together with the elm hoope, form nine tenths of the hoops manufactured. Less than a million pieces each of the remaining species were used, of which birch and basswood were the most important. Maple, used to the extent of 437,000 hoops, was the least important. Ash, the precursor of the modern elm hoop when the racked hoop was in use, has fallen off in use to 570,000 hoops, and is seventh in importance. Metal and wire hoops are offsetting to a certain extent the use of wooden hoops, but cannot be substituted entirely for the latter, as a barrel not supplemented with patent wooden hoops will usually collapse when stored on the bulges. The best and most economical results are obtained by the use of both wire and wooden hoops.

Hoops have also decreased in price \$1.29 per thousand since 1909. Basswood hoops at \$9.86 have shown themselves to be the most expensive used in 1910; ash, birch and maple cost about the same, ranging around \$9.10; the price of elm, which sets the average for all hoops, was \$8.78; spruce, the second most important hoop wood, owing to its use in small-size kegs, cost only \$5.38, thus furnishing the cheapest hoops reported.

Tight Cooperage.

The increase of \$100,000 in the value of the tight-cooperage stock produced in Canada in 1910 is due, not to a greater demand or growth in the trade, but largely to fuller reports. Reports from this industry are particularly hard to procure, since the trade is carried on by large and small manufacturers; these are often located in out-of-the-way places and carry on this work only as a sideline. The assistance of all interested in the industry is asked in the matter of securing complete and punctual returns. As tight-cooperage barrels are used in the shipping of wines, whisky, beer, ale, oils and other liquids, the stock is required to be clear and of a species which will not impart its resinous or other flavor to the contents. For these reasons oak, preferably white, is the principal wood used by the trade and as this species cannot be obtained in Canada the large shippers import it either as staves or in the log from the United States. In the latter country, however, gum and basswood are rapidly taking the place of oak in sawed tight-cooperage, so that in a short time a change in the woods used in Canada may be looked for. It is evident that, as over 80 per cent of tight cooperage stock is oak, and as all oak is imported, any increase in the use of tight-cooperage does not mean an increased drain on Canadian forests but larger importations. In 1909 tight cooperage formed 13 per cent of the total value, while in 1910 the proportion was increased to one fifth. Table 3 gives in detail the quantity, value and average value by classes of the staves used.

TABLE 3.

TIGHT-BARREL STAVES, 1910, BY CLASSES AND SPECIES OF WOOD: Total Quantity, Total Value and Average Value of the Staves produced in Canada.

| Kind of Wood. | SAWED. | | | ALE AND BEER | | | BUCKED AND SPLIT. | | |
|------------------|-----------|---------|-----------|--------------|-----------|--------|-------------------|----------------|--------|
| | Quantity. | Value. | Quantity. | Value. | Quantity. | Value. | | | |
| | | | | | | | Total. | Average per M. | Total. |
| | Thousand | \$ | \$ c. | Thousand | \$ | \$ c. | Thousand | \$ | \$ c. |
| Total..... | 7,137 | 195,788 | 27.43 | 923 | 44,814 | 48.55 | 319 | 32,322 | 101.32 |
| Oak..... | 5,308 | 151,591 | 29.31 | 923 | 44,814 | 48.55 | 319 | 32,322 | 101.32 |
| Spruce..... | 570 | 7,765 | 13.62 | | | | | | |
| Gum..... | 437 | 16,790 | 38.42 | | | | | | |
| Ash..... | 316 | 6,520 | 20.64 | | | | | | |
| Basswood..... | 131 | 4,520 | 34.50 | | | | | | |
| Birch..... | 105 | 1,350 | 12.85 | | | | | | |
| Elm..... | 82 | 1,237 | 15.09 | | | | | | |
| Douglas Fir..... | 60 | 2,100 | 35.00 | | | | | | |
| White Pine..... | 50 | 1,750 | 35.00 | | | | | | |
| Balsam Fir..... | 30 | 300 | 10.00 | | | | | | |
| Cedar..... | 28 | 565 | 20.18 | | | | | | |
| Cypress..... | 20 | 1,200 | 60.00 | | | | | | |

Tight-cooperage staves in 1910 amounted to 8,379,000 pieces, worth \$272,924. Of this amount 7,137,000 pieces, or 86.1 per cent, were sawed staves; the 923,000 ale and beer staves constituted 11.0 per cent; bucked and split staves to the number of 319,000 made up the balance.

The number of sawed staves reported in 1910 was 1,200,000 less than that reported in 1909, but this year for the first time a reliable comparison of the species used is given. Oak, always the most important wood used for tight staves, in 1910 formed nearly three quarters of the total, over 5,300,000 staves being produced. Eight per cent of the total was made up of spruce staves, which were used to the extent of 570,000, or about the same number as in 1909. Spruce also holds second position as a wood for staves in slack-cooperage stock. Gum, a species of wood not hitherto reported, which should prove itself very satisfactory on account of its durability and freeness from any taint, stands third in the table, and in one year passed all the native species except spruce. The 437,000 pieces used make six per cent of the total. Over one twenty-fifth of the total was ash, the 316,000 staves reported being 242,000 (over 300 per cent) more than in 1910. The remaining species (basswood, birch, elm, fir, pine, balsam fir, cedar and cypress) were used in varying small quantities, the last five of which, taken separately, formed less than one per cent of the total. In 1910 there were reported, in all, twelve species, five more than in 1909.

Although the quantity of sawed tight-cooperage reported in 1910 was considerably less than that in 1909 the total value was \$53,590 more; this was due to the increase of over \$10.00 per thousand in the average price. The average price in 1910 of \$27.43 per thousand is \$6.67 more than that paid in the United States for 1909, owing to the large proportion which oak forms of the Canadian total and to the fact that this species is United States wood with transportation charges added. The increase in the 1910 Canadian price is seen in all the species except oak and cedar. The price of the former, \$29.31 per thousand, is over \$6.00 less than in 1909, but the increased use more than made up the difference and brought up the total average. The greatest increase is seen in the price of Douglas fir, which at \$35.00 more than doubled its 1909 price. In 1910 balsam fir was the cheapest wood at \$10.00 per thousand pieces and cypress the most expensive at \$60.00.

The requirements of the two branches of the cooperage industry may be seen from the different species of wood used. In slack cooperage staves the most important three woods are elm, spruce and poplar; in tight cooperage oak, spruce and gum are mostly used. About 750 times as much elm was used in slack as in tight cooperage, and 330 times as much oak in the tight as in the slack branch of the industry.

The quantity of ale and beer stock reported as manufactured in 1910 was seven times the amount reported in 1909. Of the tight staves manufactured in Canada in 1910, 11.0 per cent were ale and beer stock, whereas in 1909 the percentage was only 1.5. For this class of staves, as well as for bucked and split staves, only fine-grained white oak may be used. The manufacture of these thick staves necessitates much waste, and, as the white oak supply of the United States is rapidly decreasing, the production of these expensive staves is also falling off. The quantity or value of staves of these classes used in Canada cannot be taken as any estimate of forest conditions or amount of future supplies. The 923,000 ale and beer staves produced in Canada in 1910 were reported at \$48.55 per thousand, or \$24.59 less than in 1909.

Bucked and split staves, owing to the excessive amount of waste in their manufacture, are the most expensive staves made and were used principally by one brewery firm. The 319,000 pieces used in 1910 cost an average of \$101.32 per thousand and were the most expensive reported.

In table 4 is shown the amount of tight heading produced in 1910.

TABLE 4.

TIGHT-BARREL HEADING, 1910, BY CLASSES AND SPECIES OF WOOD USED: Total Quantity, Total Value and Average Value of Tight-barrel Heading produced in Canada.

| Class. | Quantity | Value. | |
|--------------------------|---------------|--------|------------------|
| | | Total. | Average per set. |
| | Thousand sets | \$ | \$. c. |
| Grand Total | 337 | 72,240 | 0.21 |
| Sawed, total..... | 290 | 60,084 | 0.20 |
| Oak..... | 217 | 53,971 | .25 |
| Spruce..... | 53 | 4,648 | .09 |
| Douglas Fir..... | 10 | 1,100 | .11 |
| Ash..... | 5 | 363 | .07 |
| Basswood..... | 5 | 362 | .07 |
| Ale and beer, total..... | 47 | 12,156 | .25 |
| White Oak..... | 47 | 12,156 | .25 |

Owing to the indefinite manner in which the tight-heading schedules were filled out in 1910, the quantity of heading listed in the above table cannot be taken as correct. The table may be used to show, however, the various species which are used in the production of tight heading and their relative importance.

Sawed heading, like sawed staves, forms a great proportion of the total. Of the heading manufactured in Canada in 1910, 86 per cent was sawed and 14 per cent was ale and beer, which is about the same relative importance between sawed and beer staves. Oak was used in the manufacture of three quarters of the sawed heading and was the most expensive, costing an average of 25 cents a set. Spruce, Douglas fir, ash and basswood were used in smaller quantities and made less expensive heading, ranging in price from 7 cents for ash and basswood to 11 cents for fir heading per set.

Industries making ale and beer heading necessarily import the white oak, the only species used for this class of heading, from the United States. White oak timber of best grade is required in the manufacture of beer and ale heading, as in sawed staves, so that Canada is dependent on other countries for the entire supply.



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